Notice of Allowability	Application No.	Applicant(s)	
	10/735,079	KANER ET AL.	
	Examiner	Art Unit	
	Henry S. Hu	1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *Amendment of May 24, 2006*.

2. ☒ The allowed claim(s) is/are *1-20*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

1. This Office Action is in response to **Amendment** filed on May 24, 2006. **Claims 1-2, 9 and 14 were amended; no claim was cancelled, while new Claims 19-20 were added.** To be more specific, parent **Claims 1 and 14** as well as dependent **Claim 9** were amended to specify the use of two phases including aqueous solution and organic solution. Dependent **Claim 2** was only amended to correct typographical error pointed out in claim objection. Figure 1B was amended; the examiner thereby accepts the **drawing with eight figures in six sheets. Claims 1-20 are now pending** with a total of three independent claims (Claim 1, Claim 14 and Claim 19). An action follows.

2. Claim rejections under **Non-Final** Office Action filed on December 15, 2005 are now removed for the reasons given in paragraphs 3-11 thereinafter.

Allowable Subject Matter

3. Claims 1-20 are allowed.

4. The following is an examiner's statement of reasons for allowance: The above Claims 1-20 are allowed over the closest references:

5. The limitation of parent **Claim 1** in present invention relates to ***a method of producing organic polymer nanofibers*** *having a reaction to chemical vapors, the method comprising:*

(a) ***forming a catalysis aqueous solution comprising an acid and an oxidizer,***

(b) ***forming a monomer organic solution comprising a monomer and an organic solvent,*** *and*

(c) ***disposing*** *the catalysis aqueous solution upon the monomer organic solution* ***for forming an aqueous and organic interfacial interface*** *between the catalysis aqueous solution upon the monomer organic solution for generating the organic polymer nanofibers.*

Other parent ***Claim 14*** *relates to the same method of Claim 1 but to prepare organic* ***conducting*** *polymer nanofibers. Newly added parent* ***Claim 19*** *relates to Claim 1 but is more specified on the use of monomers, acids, oxidizers and organic solvents.*

See other limitations of dependent ***Claims 2-13, 15-18 and 20.***

6. Applicant has now claimed in each of **three parent process Claims 1, 14 and 19 (new** Claim 19 is written and/or modified directly from original parent Claim 1**)** an unexpected way of **obtaining polymer nanofibers** directly from catalytic organic reaction of **an aqueous and organic interfacial interface interaction.** In a close examination, parent **Claim 14** relates to the same method of Claim 1 but to prepare organic "**conducting**" polymer nanofibers such as polyaniline and the like conducting polymers. Newly added parent **Claim 19** relates to Claim 1 but is more specified on the use of monomers, acids, oxidizers and organic solvents.

In a close examination on such a **clarified wording** on using interface reaction between two phases (aqueous and organic) so as to "directly" form polymer in the nanofiber form, both 102 and 103 rejections based on Noding and Cheng as well its 103 rejection cannot stand alone as following:

7. As discussed in earlier office action, Noding depends on single phase for running the polymerization. The coupling product from oxidative reaction by persulfate is then precipitated out in reaction mixture to form a "bulk polymer", which is quite different from nanofiber form. **Even interfacial polymerization process may be used by Noding so as to more effectively improve the yield of polyaniline as well as increasing its conductivity and molecular weight** (column 1, line 16-20; abstract, line 9-11; column 6, line 21-65). No mention is on formation of nanofiber at all (see Applicants' argument from page 14 bottom section to page 15 top section of Remarks).

8. Again, Cheng reference has the same problem since only single phase is used. As discussed earlier, Cheng only discloses the preparation of **low molecular weight polyaniline** by heating a para-haloaniline in the presence of **a high-boiling organic solvent** and a vanadium catalyst and then by removing hydrogen halide as it is produced (abstract, line 1-5). Although the preparation steps may involve the claimed interfacial interface reaction which includes **contacting aniline monomers with acidic aqueous or mixed aqueous and organic solvents by using chemical oxidants such as ammonium persulfate.** However, it may be still in

single phase. No mention is on formation of nanofiber at all (see Applicants' argument from page 14 bottom section to page 15 top section of Remarks).

The secondary reference **Stupp** in 103 rejection only discloses that in the course of surface modification thiol functional group can be used to bind it to a gold substrate (column 11, line 41-44). By doing so, any amphiphilic molecule containing such a thiol group can be thereby first covalently coated onto the gold substrate, and then other material such as carbon nanotubes can be effectively binds as top coating. Even a motivation is existed to teach dependent Claim 10, Stupp still cannot fix the deficiency of Noding or Cheng.

9. It is noted by this Examiner that the process used to form polymer in nanofiber form is quite different from that to form a precipitated polymer or to form a free-standing polymer film such as in the case of **nylon**. It would necessarily take special condition to achieve a nanofiber form (see Figure 5 for detailed process in this application). Additionally, its property and performance may be at least somewhat different. Therefore, all the above-mentioned references, in combination or alone, does not teach or fairly suggest the limitations of present invention.

10. After further examination and search, the examiner found the following prior art did not teach the claimed limitation:

US Patent No. 7,074,887 B2 to Wang et al. only discloses the preparation of chiral and conductive polymers by oxidative reaction in the presence of a chiral dopant acid (abstract, line 1-5; column 2, line 36-48). Although **polyaniline or polypyrrole can be prepared** and may be in **nanofiber form**, only single phase is disclosed (see detail in column 5, line 47-65, only water-miscible organic solvent such as methanol, acetonitrile is used with water). No interfacial interface polymerization process between two phases is disclosed. Therefore, Wang fails to teach the claimed process limitation of present application.

11. The key issue on making **polymer nanofibers** directly from catalytic organic reaction of **an aqueous and organic interfacial interface interaction**, cannot be overcome by any or the combination of the above references, therefore, the present invention is novel.

12. As of the date of this office action, the examiner has not located or identified any reference that can be used singularly or in combination with another reference including the above references to render the present invention anticipated or obvious to one of the ordinary skill in the art. Therefore, the three independent and parent process **Claims 1, 14 and 19** are allowed for the reason listed above. Since the prior art of record fails to teach the present invention, the remaining pending dependent **Claims 2-13, 15-18 and 20** are passed to issue.

13. Any inquiry concerning this communication or earlier communication from the examiner should be directed to **Dr. Henry S. Hu whose telephone number is (571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The **fax** number for the organization where this application or proceeding is assigned is **(571) 273-8300** for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Henry S. Hu

Patent Examiner, art unit 1713, USPTO

August 4, 2006

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